Claims

What is claimed is:

1. A method of forming a semiconductor device, comprising:

providing a substrate;

forming a first layer of semiconductor material over the substrate;

removing a portion of the first layer to provide a layer offset between a removed portion of the first layer and a remaining portion of the first layer;

forming an oxide layer of uniform thickness over the removed portion of the first layer and the remaining portion of the first layer;

planarizing the oxide layer so that the oxide layer over the remaining portion of the first layer is removed;

forming a polysilicon region over the planarized oxide layer;

forming an epi region over the remaining portion of the first layer;

forming a trench between the polysilicon region and the epi region extending vertically down to the oxide layer; and

depositing oxide in the trench down to the oxide layer to isolate the polysilicon region.

2. The method of claim 1, wherein the substrate is N-type semiconductor material.

3. The method of claim 1, wherein the first layer of semiconductor material receives N-type dopants.

4. The method of claim 1, wherein the step of removing a portion of the first layer includes the step of removing the first layer substantially down to the substrate.

5. The method of claim 1, further including the steps of:

forming a first well in the polysilicon region;

forming a second well in the first well;

forming a first transistor in the first well; and

forming a second transistor in the second well.

6. The method of claim 5, further including the steps of: forming a third well in the epi region; and

forming a power transistor in the third well.

7. A method of forming an integrated circuit having a driver device in proximity to a power device, comprising:

forming an oxide layer below the driver device;

forming a trench between the driver device and the power device, wherein the trench extends down to the oxide layer; and

depositing oxide in the trench down to the oxide layer to isolate the driver device from the power device.

8. The method of claim 7, further including the steps of:

providing a substrate;

forming a first layer of semiconductor material over the substrate;

removing a portion of the first layer to provide a layer offset between a removed portion of the first layer and a remaining portion of the first layer; and

forming the oxide layer having uniform thickness over the removed portion of the first layer and the remaining portion of the first layer.

9. The method of claim 8, further including the steps of:

planarizing the oxide layer so that the oxide layer over the remaining portion of the first layer is removed;

forming a polysilicon region over the planarized oxide layer;

forming an epi region over the remaining portion of the first layer; and

forming the trench between the polysilicon region and the epi region extending vertically down to the oxide layer.

10. The method of claim 9, wherein the first layer of semiconductor material is an extension layer of the substrate.

11. The method of claim 9, wherein the first layer of semiconductor material is an epi layer.

12. The method of claim 9, further including the steps of:

forming a first well in the polysilicon region;

forming a second well in the first well;

forming a first transistor in the first well; and

forming a second transistor in the second well.

13. The method of claim 12, further including the steps of: forming a third well in the epi region; and

forming a power transistor in the well.

14. A semiconductor device having a driver device in proximity to a power device, the semiconductor device being made by the process comprising the steps of:

forming an oxide layer below the driver device;

forming a trench between the driver device and the power device, wherein the trench extends down to the oxide layer; and

depositing oxide in the trench down to the oxide layer to isolate the driver device from the power device.

15. The semiconductor device of claim 14, wherein the process further includes the steps of:

providing a substrate;

forming a first layer of semiconductor material over the substrate;

removing a portion of the first layer to provide a layer offset between a removed portion of the first layer and a remaining portion of the first layer; and

forming the oxide layer having uniform thickness over the removed portion of the first layer and the remaining portion of the first layer.

16. The semiconductor device of claim 15, wherein the process further includes the steps of:

planarizing the oxide layer so that the oxide layer over the remaining portion of the first layer is removed;

forming a polysilicon region over the planarized oxide layer;

forming an epi region over the remaining portion of the first layer; and

forming the trench between the polysilicon region and the epi region extending vertically down to the oxide

layer.

17. A method of forming a first semiconductor device in proximity to a second semiconductor device on an integrated circuit, comprising:

forming an oxide layer below the first semiconductor device;

forming a trench between the first and second semiconductor devices, wherein the trench extends down to the oxide layer; and

depositing oxide in the trench down to the oxide layer to isolate the first and second semiconductor devices.

18. The method of claim 17, further including the steps of:

providing a substrate;

forming a first layer of semiconductor material over the substrate;

removing a portion of the first layer to provide a layer offset between a removed portion of the first layer and a remaining portion of the first layer; and

forming the oxide layer having uniform thickness over the removed portion of the first layer and the remaining portion of the first layer.

19. The method of claim 18, further including the steps of:

planarizing the oxide layer so that the oxide layer over the remaining portion of the first layer is removed;

forming a polysilicon region over the planarized oxide layer;

forming an epi region over the remaining portion of

the first layer; and

forming the trench between the polysilicon region and the epi region extending vertically down to the oxide layer.

20. A semiconductor device, comprising:

a first semiconductor device;

a second semiconductor device physically proximate and electrically coupled to the first semiconductor device;

an oxide layer disposed below the first semiconductor device; and

an oxide-filled trench disposed between the first and second semiconductor devices, wherein the oxide-filled trench extends down to the oxide layer to provide isolation between the first and second semiconductor devices.

21. The semiconductor device of claim 20, further including:

a first well disposed above the oxide layer;

a second well disposed in the first well;

a first transistor formed in the first well; and

a second transistor formed in the second well.

22. The semiconductor device of claim 21, further including:

a third well disposed opposite the trench from the first well; and

a third transistor formed in the third well.

23. The semiconductor device of claim 20, wherein the first and second transistors form a driver circuit.

24. The semiconductor device of claim 20, wherein the first and second transistors are thin film transistors.